Finca Verde innovation project- Nutrient Film Technology

Lettuce grown using hydroponic technology at Finca Verde Farm, Mukono

Background

The Integrated Seed Sector Development (ISSD) Plus Project's Vegetable Component aims at contributing to the increased competitiveness of the vegetable sector actors, through promoting the use of superior Dutch seed varieties and equipping vegetable producers with skills and knowledge of Good Agronomic Practices for higher production and productivity.

The Vegetable component also prioritizes efforts towards improving food safety management in vegetable production, in reduction of chemicals used and added during production to protect: the health of farmer, farm employees, the final consumers and the environment as a whole. However, this is difficult due to the need of excessive chemicals to combat pests and diseases that severely affect vegetables, and the gaps in capacity to safely use the agrochemicals (pesticides and fertilizers) needed for increased production.

To combat this challenge, the ISSD-Plus Project; through its procurement policy published a notice inviting 'innovation projects', that could ensure high productivity of vegetables with limited exposure to harmful chemicals. It is through this that the partnership with Finca Verde began. Finca Verde in its submission, planned to utilize Nutrient Film Hydroponic Technology (NFT) to tackle this problem.

ISSD Plus put up 50% of the total cost of setting up Finca Verde's model NFT production farm, where vegetable producers would receive training on the system and the practical benefits of adopting it.

About Finca Verde

Finca Verde is located in Mukono District, about an hour East of the capital city, Kampala. The farm is approximately 23 acres of good agricultural land, with 4 acres currently in use, has a good water source and reasonably good access roads. The farm's location is also convenient, as it serves the central region and its surroundings.

Founded in June 2014 by proprietors; Hans and Edna Barendse, the farm aimed to produce and meet the growing demands for quality exotic lettuces and vegetables for a very large dissatisfied growing market. Initially it focused only on lettuce, but Hans and Edna soon realized that consistent supply of the local vegetables was lacking and expanded their production.

The farm started producing different varieties of Lettuce (Lollo rosso, Lollo bionda, butter head, oak leaf etc.), Cresses (water cress, garden cress, broccoli cress, red cabbage cress etc.) Vegetables (e.g. kale, spinach, radishes, cucumber, French beans) and herbs (basil, parsley, coriander, chives, mint, thyme etc.) to satisfy the large market demand.

The Challenge

Whilst producing the vegetables, Finca Verde encountered one major challenge. The farm's vegetable production was severely challenged by prevalence of nematode infestations. Lettuce in particular is highly affected by nematodes, requiring the use of synthetic nematicides for management, and to reduce crop damage. However, these chemicals are expensive and highly toxic with the added disadvantage of a long residue period which compromises the safety of the lettuce for consumption.

Since nematodes are soil bone, the best solution to the challenge was to grow lettuce on soilless media, i.e. hydroponically. Hydroponics is the process of growing plants in sand, gravel or liquid, with added nutrients but without soil. There are a number of hydroponic systems, such as Wick Systems, Deep Water Culture (DWC), Nutrient Film Technique (NFT), Ebb and Flow, Aeroponics and Drip Systems, all of which require a high initial investment.

Nutrient Film Technology

Lettuce is grown using Nutrient Film Technology in the greenhouse constructed in partnership with ISSD Plus at Finca Verde Farm

Finca Verde specifically opted to adopt Nutrient Film Technology, a hydroponic technique where a shallow stream of water containing all the dissolved nutrients required for plant growth is recirculated past the bare roots of the vegetable plants in watertight channels. Though the technology requires a high investment initially, it is very efficient, environmentally friendly and allows for sustainable production of lettuce as a business.

Advantages of Nutrient Film Technology

• The technology provides for the capacity to recycle the excess nutrient solution, thus making optimal use of water and fertilizers.

• Chemicals and fertilizers are not added to the soil, thus soil life is conserved and there is no leaching of nutrients into the underground water.

• Allows for continuous production of the same crop without fear of accumulation of inoculum of any disease since equipment can be effectively disinfected at the end of every crop cycle. There is therefore no need for crop rotation.

• Allows for intensive cultivation (higher plant populations than in the field cultivation) thus less pressure on land.

• Since the vegetables are grown hydroponically, they are not affected by pests in the soil, and therefore the amount of pesticides and chemicals used is very minimal, thus cost efficiency.

• Gives farmers the benefits of water conservation and also having complete control over nutrient balance, which can be altered as needed to suit different vegetables.

• A hydroponic garden effectively utilizes small spaces, and can even be used indoors.

• Higher and faster vegetable yields with better quality produce and year-round growing.

Accomplishments as at 2020

Hans Barendse, of Finca Verde Farm and Cate Nakatugga, the ISSD Plus Vegetable manager address farmers during an educational tour of the NFT screenhouse

• Finca Verde trained more than 100 farmers on the Nutrient Film Hydroponic Technology out of which 2 farmers adopted the system. Each of the two modified the structure of the greenhouse to make it more affordable without compromising the required properties of a functional structure.

• The farm has specialized in lettuce production and is able to put lettuce on the market all year round which has boosted the farm's reputation and reliability in the market and the business performance in general. Consumers are more confident of the quality and safety of the lettuce and are able to have it as and when they need it. The farm's clientele base has grown.

• The quality of the lettuce is better (bigger and heavier heads) and growth period is shorter.

• Vegetables (lettuce) are safer: Nematicides are not used at all and due to shortened growth period and improved plant vigor the farm has experienced significant reduction in use of fungicides and insecticides too. The reduction in expenses on pesticides is around 50-60%. This implies improved safety for the environment, consumers and the workers on the farm.

• Adoption of the Nutrient Film Technology in production of fast-growing leafy vegetables contributes to improved food safety management in leafy vegetables as most are fast growers and hardly allow for breakdown of pesticides to safe levels before harvesting, thus are always susceptible to poisoning from pesticides.

• The technology is more profitable than the field cultivation as it gives higher salable yields and enables savings on pesticides, water, fertilizers, duration of production cycle, and labor.

With funding from the Embassy of the Kingdom of the Netherlands, the ISSD Plus Project implemented by the Wageningen University and Research's Centre for Development Innovation, has paved a way for the adoption of hydroponic techniques for safer and higher production of vegetables in Uganda.

Farmers after a field day at Finca Verde Farm